PRELIMINARY Health Assessment for

MONSANTO - SODA SPRINGS PLANT

SODA SPRINGS, CARIBOU COUNTY, IDAHO

CERCLIS NO. IDD081830994

JUNE 6, 1991

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Agency for Toxic Substances and Disease Registry

Comment Period Ends :

JULY 17, 1991

THE ATSDR HEALTH ASSESSMENT: A NOTE OF EXPLANATION

Section 104 (i) (7) (A) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, states "...the term 'health assessment' shall include preliminary assessments of potential risks to human health posed by individual sites and facilities, based on such factors as the nature and extent of contamination, the existence of potential pathways of human exposure (including ground or surface water contamination, air emissions, and food chain contamination), the size and potential susceptibility of the community within the likely pathways of exposure, the comparison of expected human exposure levels to the short-term and long-term health effects associated with identified hazardous substances and any available recommended exposure or tolerance limits for such hazardous substances, and the comparison of existing morbidity and mortality data on diseases that may be associated with the observed levels of exposure. The Administrator of ATSDR shall use appropriate data, risks assessments, risk evaluations and studies available from the Administrator of EPA."

In accordance with the CERCLA section cited, ATSDR has conducted this preliminary health assessment on the data in the site summary form. Additional health assessments may be conducted for this site as more information becomes available to ATSDR.

The conclusion and recommendations presented in this Health Assessment are the result of site specific analyses and are not to be cited or quoted for other evaluations or Health Assessments.

Use of trade names is for identification only and does not constitute endorsement by the Public Health Service or the U.S. Department of Health and Human Services.

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Prepared by:
Division of Health Assessment and Consultation
Agency for Toxic Substances and Disease Registry

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SUMMARY

The Monsanto Chemical Company, located in Soda Springs, Idaho, has been proposed for inclusion on the National Priorities List. This plant processes locally mined phosphate ore to produce elemental phosphorus. The active plant occupies 530 acres and is located approximately 1 mile north of the town of Soda Springs. Ore is stockpiled on-site before being processed for introduction into electric arc furnaces along with coke and silica. All process waters, with the exception of noncontact cooling water, are held and treated on-site and then reused. The noncontact cooling water is discharged from the site and used in agricultural irrigation. The process waters, previously stored in unlined ponds or impoundments, have been implicated as sources of contamination to the local groundwater. Contaminants found both on-site and off-site at levels of potential public health concern include cadmium, selenium, vanadium, and fluoride. Fluoride was found at 6 to 7 mg/l in a residential well immediately south of the plant property. All currently active process water impoundments have been lined. Soil from the old ponds has been removed and backfilled with clean cover material. Currently, a network of approximately 52 monitoring wells is maintained to assess plume migration. Other potential sources of pollution include waste slag, fugitive dust emissions, air emissions from ore processing and the electric arc furnaces, and cadmium-contaminated, noncontact cooling water discharged to Soda Creek. The air emissions, which include sulfur oxides and particulates are controlled as required by the State. The current environmental medium of concern is the groundwater. Soda Springs' drinking water supply is taken from sources located northeast and southeast of the Monsanto facility. Formation Springs and Ledge Creek Springs, to the northeast, are hydraulically upgradient from the Monsanto facility. Ledge Creek, to the southeast, has not been conclusively demonstrated to be upgradient or downgradient from Monsanto. The one known owner of the contaminated residential well discussed above is currently being supplied municipal water. Also, since Monsanto began corrective actions, the residential well water is again meeting all drinking water standards. The site is of potential public health concern because of possible exposure to contaminants via ingestion, inhalation, and dermal absorption from groundwater use and inhalation of plant air and fugitive dust emissions. Groundwater protection will remain a concern until it can be demonstrated that the contamination source and plume no longer pose a potential health threat. Groundwater monitoring should be continued to support such a determination.

In April 1990, the Environmental Protection Agency (EPA) released the "Idaho Radionuclide Study," which addresses radiation exposures associated with byproduct materials produced when processing phosphorus ores. In response to EPA's request for

comment, the Agency for Toxic Substances and Disease Registry prepared a Health Consultation and transmitted it to EPA in May 1990. Key recommendations from that Consultation that are relevant to this Preliminary Health Assessment are included in the Recommendations Section of this report.

PRELIMINARY HEALTH ASSESSMENT - PUBLIC COMMENT COPY

BACKGROUND

A. SITE DESCRIPTION AND HISTORY

The Monsanto Chemical Company (Monsanto) facility at Soda Springs, Idaho (see Figures 1 and 2 attached), processes locally mined phosphate ore to produce elemental phosphorus. The facility consists of more than a dozen administrative and processing buildings plus ore piles, slag piles, by-product materials, surface impoundments, and a waste landfill. The 530 acre fenced site is located about 1 mile north of the town, on the west side of State Highway 34. In 1952, Monsanto purchased the site, built the plant, and started operations. The site is fenced. The closest surface water is Soda Creek located approximately 2,000 feet west of the facility. The plant is currently staffed with about 400 employees. Two of three on-site production wells provide potable water for employee consumption. Approximately 1 million tons of phosphate ore are processed through the plant each year. The ore is first "nodulized" in a rotary oxidation kiln where organic contaminants are released and burned. Some fluorides (about 0.7 pounds per hour) are allowably released from this process. Carbon monoxide generated in the final electric arc furnaces is recycled as a supplemental fuel to provide heat for the nodulizing process.

Nodulized ore to be reduced to elemental phosphorus is fed with coke and silica into one of three electric arc furnaces. The process gases contain phosphorus, silicon tetrafluoride, and carbon monoxide. The phosphorus is condensed out for recovery, and the particulates are removed in a high energy venturi scrubber. The carbon monoxide is cycled back to the nodulizer as described above. Molten slag from the process is periodically tapped from the furnace. The heavy fraction of the slag consisting primarily of metals (iron, vanadium, and others) is tapped separately and sold to another company for extraction of the vanadium.

Monsanto has initiated a number of environmental studies to characterize potential impacts from its operations. In 1980, the slag was analyzed for Extraction Procedure (EP) toxicity parameters established by the Environmental Protection Agency (EPA) and found not to exceed any of the standards. In 1984, Golder Associates was commissioned to evaluate groundwater and surface water impacts resulting from current and past activity. Thirty-one new monitoring wells were installed to supplement seven existing wells (additional wells have been added subsequently). This investigation showed groundwater under the site to be contaminated with fluoride, cadmium, selenium, vanadium, and other inorganic species of less concern. The sources of the contamination were hypothesized to be the

underflow solids pond, the northwest pond, and the hydroclarifier. The underflow solids pond was subsequently abandoned with the upper layer of contaminated soil removed, backfilled with clean material, and capped to prevent further migration of contaminants. The northwest pond was also abandoned and is now being operated as a lined general waste landfill. The hydroclarifier has been rebuilt to allow complete and routine inspection for leakage, none of which has been found. A separate plume showing contamination with chloride, sulfate, and vanadium exists in the southeast portion of the site. This plume is hypothesized to originate east of the Monsanto site.

In 1987, Ecology and Environment, Inc. (E. & E.), an EPA contractor, performed further site sampling as part of the site inspection. Contamination was found in monitoring and production wells. One of the contaminated production wells was being used for drinking water by plant employees at the time (see Environmental Contamination and Other Hazards Section).

B. SITE VISIT

Representatives of ATSDR, EPA, and E. & E. conducted a site visit on October 4, 1989. Monsanto personnel provided an overview of plant operations, air monitoring programs, and water and waste management programs. The area immediately adjacent to the facility boundaries is sparsely populated. About 0.2 miles south of the property line is one residence that did have contaminated well water (fluoride, 6 to 7 mg/l). East of the site, immediately across Highway 34, is the Kerr-McGee vanadium processing plant (approximately 60 employees). North of the site is open land and west of the site, near Soda Creek, is a naturally carbonated and highly mineralized spring. The spring is a local tourist attraction.

C. COMMUNITY HEALTH CONCERNS

No reports of citizen health concerns were expressed by state or federal officials contacted during the site visit or contained in the file materials that were reviewed. EPA, however, subsequently provided documentation from the above-mentioned residents regarding health problems that they (the residents) believe are attributable to contamination from the Monsanto facility.

DEMOGRAPHICS, LAND USE AND NATURAL RESOURCE USE

Land use in the vicinity of the Monsanto facility is primarily industrial and agricultural. Population density for the area is sparse. Within 1 mile of the site there are 27 residents. Within 2 miles of the site there are about 1,400 residents.

Within 3 miles of the site there are about 3,100 residents, which includes the major portion of the population of Soda Springs (1). Most of the community residents' water is supplied by the town of Soda Springs. This water is obtained from Formation Springs and ~~Ledge Creek Springs~~ Ledge Creek Springs located to the northeast of both the town and the plant, and from Ledge Creek Springs southeast of the plant. ~~The springs are~~ Formation Springs is thought to be hydraulically upgradient from the Monsanto site; however, Ledge Creek may be downgradient (2, 3). Twenty-two domestic wells are registered within 3 miles of the Monsanto facility, again many of which are said to be upgradient of the Monsanto site. Seven irrigation wells are registered within 3 miles of the site. Hooper Springs, located downgradient of the site, is used by residents and tourists for drinking water. The only family known to have been affected by off-site groundwater contamination is at the residence mentioned above. This family was subsequently provided city water.

unclear what residence is being referred to

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

A. ON-SITE CONTAMINATION

Groundwater samples from three production wells on-site and one domestic well off-site were analyzed for organic chemicals on the EPA Target Compound List. None were detected.

Samples from on-site monitoring wells located downgradient from contamination sources showed elevated groundwater concentrations of cadmium, selenium, vanadium, fluoride, and other inorganic species in comparison to samples from upgradient monitoring wells. Cadmium and selenium concentrations were above EPA Maximum Contaminant Levels (MCLs) for drinking water in a number of the on-site monitoring and production wells (2). Table 1 shows the highest reported contamination levels both on- and off-site.

Drummed vanadium pentoxide material, asbestos, and "PCB filter" were previously buried on-site (1). This practice has been discontinued, and any currently produced hazardous waste is hauled off-site by a commercial hazardous waste hauler. Only general waste continues to be disposed on site in a lined landfill. The available data do not suggest that any of the solid waste land disposal practices have had any environmental impact.

On-site activities produce air emissions of dusts, sulfur oxides, and fluorides, which are controlled by air pollution cleaning devices designed to meet State air requirements. Overt signs of air emissions, such as odors, smoke, or dusts, appeared to be limited to the facility property during the site visit. In

addition to the direct control activities mentioned above, EPA-accepted dispersion models to predict air concentrations of known pollutant source concentrations at the facility boundary lines have been used. For cadmium and fluorides, the major pollutants of concern, the predicted concentrations ranged from 40 to 40,000 times less than the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values (TLVs) for these pollutants. The model results have not been validated with actual ambient air sampling data.

B. OFF-SITE CONTAMINATION

The Site Inspection results (2) showed elevated levels of selenium, cadmium, zinc, and vanadium in an off-site spring (about 1,000 feet southwest of the site) and in the plant noncontact cooling water effluent discharged to surface water. No levels, however, exceeded Primary Drinking Water Standards (note that no standard exists for vanadium). This plant effluent supplements irrigation water used to irrigate 4,300 acres of cropland (mostly grain crops).

The EPA Site Inspection analysis of the previously contaminated off-site domestic well showed no further indication of fluoride contamination, and the well met all drinking water standards.

There was no readily observable evidence of off-site contamination from air pollutants or past solid waste disposal practices. No off-site ambient air or soil data were available for review.

Table 1

Monsanto, Soda Springs
Groundwater Contamination
Highest Reported Concentrations (11/87)
(mg/l)

	On-site	Off-site
Cadmium	5.52	.032
Selenium*	.775	.091
Vanadium	.153	.033
Fluoride	22.00	6-7**

* Estimated
** Reported to ATSDR during site visit.

C. QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

The results of this Preliminary Health Assessment are based largely on data developed for the EPA Site Inspection Report dated April 1988. QA/QC measures were outlined but not detailed. The data are assumed to be accurate within the QA/QC procedures utilized.

D. PHYSICAL AND OTHER HAZARDS

The Monsanto plant is an active industrial operation with potential for accidents as would be expected at any similar facility. There is evidence of an active safety program throughout the facility.

The radiation possibly being emitted by waste products from the Monsanto site may be a hazard to human health. In April 1990, EPA released the Idaho Radionuclide Study. This report addresses radiation exposures associated with by-product materials produced when processing phosphorus ores. EPA asked ATSDR to comment on the study. In response to this request, ATSDR prepared a Health Consultation that was transmitted to EPA in May 1990. Since the EPA report directly addresses by-product material produced by the

Monsanto facility, the remainder of this section is devoted to reviewing the findings of the ATSDR Health Consultation. The recommendations from the Consultation are included in the Recommendations Section of this Preliminary Health Assessment.

Ores containing phosphorus by-product materials normally contain elevated levels of radioactive materials. During production of phosphorus, radioactive materials, regulated under the National Emission Standards for Hazardous Air Pollutants (NESHAP), are released into the air. The solid waste produced in these processes contains concentrations of radioactive materials at levels that may be considered hazardous to human health under appropriate conditions. In Soda Springs, the slag has been used for street paving and sidewalk construction. In response to this exposure to radioactive materials, EPA evaluated exposure scenarios for populations in Pocatello and Soda Springs, Idaho.

EPA performed aerial radiological surveys, ground measurements, and pressurized ionization chamber readings to quantify the radiation exposures in the Pocatello and Soda Springs areas. The cities were divided into radial sectors centered on the respective phosphorus plants. The populations and the estimated exposure rate were determined for each sector. From these determinations, an average exposed individual and a maximum exposed individual were postulated using scenarios developed by the EPA and its contractors.

ATSDR has reviewed the exposure pathways as discussed in the EPA Idaho Radionuclide Study and finds these exposures and scenarios credible. However, ATSDR believes cases exist in which the calculated exposures could be higher than those suggested by EPA.

In evaluating the radiation exposure and risks present, EPA in its report used a value of 400 excess cancer deaths per million person-rem exposure to the population. The risks expressed in the document are based on a summation of the risks across the population and over the estimated total exposure. According to the exposure scenarios, the number of excess deaths in Pocatello (pop. 57,000) would be 0.3 per year, and in Soda Springs (pop. 3,800) the number of excess deaths, because of exposure, would be 0.1 per year. In the recent BEIR V report, a review of the exposure data from Hiroshima and Nagasaki has resulted in a reevaluation of risk estimates (4). These values, if used, would approximately double the risks predicted by the EPA in the 1990 Idaho Radionuclide Study.

Is this True ?

The International Commission on Radiological Protection (ICRP), in a 1987 publication (ICRP Report 26), recommended that the annual exposure to a non occupationally exposed person (the public) not exceed

100 milliroentgens (mR) (5). In another 1987 publication, the National Council on Radiation Protection and Measurements (NCRP) in Report 91 states "For continuous (or frequent) exposure, it is recommended that the annual effective dose equivalent not exceed 1 millisievert (mSv)
(0.1 rem) (6)." This includes exposures from manmade sources such as the slag but does not include exposures from medical procedures. NCRP further suggests that remedial action be taken when the external exposure continuously exceeds 500 mR per year, including background level.

ATSDR believes the exposure levels predicted for Soda Springs may pose a distinct public health concern or hazard to the residents.

PATHWAYS ANALYSES

A. ENVIRONMENTAL PATHWAYS (FATE AND TRANSPORT)

Groundwater under the Monsanto site has been shown to contain elevated levels of metals and other ions. Contamination exists in two basalt hydrostratigraphic zones, an upper zone and lower zone separated by a basalt aquitard. The upper zone has higher concentrations and more widely distributed contamination. On-site production wells are thought to heavily influence the flow of groundwater, which generally flows to the south in the site area.

Drinking water for Soda Springs is taken from multiple sources located hydraulically upgradient and possibly downgradient from the Monsanto site. Of the 22 wells registered within 3 miles of the site, it is not known how many would be located downgradient of the site or how they would be used. Only one well, located immediately south of the site, has been sampled.

No data were available to indicate any significant off-site impact from air emissions from plant activities; however, EPA reports that nearby residents have observed fugitive dust emissions. The potential exists for airborne dust and fine particulates to migrate during ore-handling and earth-moving operations. No data indicating the potential for contaminants to leach from soil or ore were available for review. Slag was analyzed for EP Toxicity and found not to exceed any of the Resource Conservation and Recovery Act (RCRA) standards for hazardous waste.

Should note here that Monsanto is under an NESHAP permit regulating stack emissions for Polonium. Past emissions may have had an impact.

B. HUMAN EXPOSURE PATHWAYS

The presence of site-related compounds in on-site and off-site groundwater monitoring stations indicates an existing plume of contamination that is impacting local groundwater quality. No off-site potable water wells are known to be affected at this time. The well that was previously contaminated with fluoride is no longer used for consumption. This well now meets all Safe Drinking Water Standards.

Two of three on-site wells are used for process and potable water. These wells show elevated levels of potassium (4.8 mg/l, estimated) and vanadium (.038 mg/l, estimated). The third production well was used by employees for drinking water until 1984. This well had cadmium levels reported up to 0.09 mg/l, which exceeds the EPA MCL of 0.01 mg/l. Monsanto plans to provide a new drinking water supply for its employees. Human contact through ingestion of known contaminated groundwater

appears to be limited to these on-site production wells used by Monsanto.

Most of the identified contaminants of concern for this site are not highly volatile and therefore would not be anticipated to present a major potential for human exposure via inhalation of the gaseous forms. Fugitive dusts from ore handling and processing, soil movement for on-site landfill operations, and slag handling may present exposure opportunities through inhalation, particularly on-site. A number of techniques, including air pollution control devices, negative air handling systems, and ore pile treatment, were used at this facility to minimize the potential for air emissions. On the day of ATSDR's site visit, fugitive emissions did not appear to present a significant potential for exposure on- or off-site. However, more observation--possibly including ambient air sampling--under a variety of meteorological conditions would be needed to eliminate the inhalation of fugitive air emissions as a potential pathway of concern.

Process emissions--which include fluorides, sulfur oxides, and particulates--are regulated under State air quality requirements. In addition to implementing control technology to meet regulatory requirements, Monsanto models its point source emissions to determine potential impacts at its property line. For the worst-case scenarios modeled to date, concentrations at the property line have ranged from one to four orders of magnitude under the ACGIH thresholds for the pollutants in question. Actual receptor site exposure data were not available.

On-site well water used for showering or bathing could present a route for human exposure through dermal absorption. Similarly, fugitive dusts or airborne soil particles on exposed skin areas could serve as another potential for dermal exposure. Lack of chemical characterization of these sources of particulates precludes detailed evaluation of this mode of exposure.

With the exception of the previous off-site well water exposure, the above identified human pathway exposures would appear to be limited largely to the on-site work population, given the sparse population in the immediate vicinity of the plant. Acute and/or long-term public health consequences would be anticipated within the work force much earlier than for the general area public.

PUBLIC HEALTH IMPLICATIONS

Vanadium and cadmium were found at elevated levels in production water previously used for drinking purposes by workers on-site,

and cadmium, selenium, vanadium, and fluoride have previously been found at elevated levels in groundwater off-site. Elevated levels of cadmium, selenium, and vanadium have been found in plant effluent (non contact cooling water). Plant effluent is diluted with natural surface waters and used for irrigation purposes.

Available evidence does not show vanadium in drinking water to be a problem (7). However, vanadium compounds that might be found in fugitive dust emissions could be irritating to the respiratory tract, eyes and skin, and other body systems. Vanadium salts are considered extremely toxic by the oral route (8).

Selenium and cadmium both have allowable MCL concentrations for drinking water of .01 mg/l. In the literature, human death has been attributed to ingestion of unknown amounts of selenium; in one case death was thought to be due to high levels of organic selenium contained in locally grown foods (9). Gastrointestinal distress has been reported to follow the ingestion of toxic amounts of sodium selenite. Varying neurological effects, including aches, pains, irritability, and listlessness, were reported for humans experiencing elevated dietary intake of selenium. Selenium has not been shown to be carcinogenic. Results of epidemiological studies show an inverse relationship between dietary selenium and human cancer occurence.

Ingestion of excess amounts of cadmium (50 to 300 mg/kg body weight) can lead to death in humans from excess fluid loss. Adverse effects on kidney, liver, bone, testes, and the immune and cardiovascular systems, may result from oral exposure to cadmium. Normal dietary cadmium intake averages 15 to 30 micrograms per day and is from water and plant materials, particularly grains and cereals (10).

Ingestion of water containing excess fluorides can lead to mottling of teeth in children, skeletal fluorosis, gastrointestinal symptoms and central nervous system involvement (7). Mottled teeth were reported for the children who were exposed to fluoride in their well water.

Of the above contaminants, the Monsanto work force is currently only exposed to vanadium--at levels up to approximately .038 mg/l--through the ingestion of contaminated groundwater. The available data do not suggest that this concentration would present a health problem.

Data are insufficient to judge the potential impact of contaminated groundwater plumes underlying the Monsanto site on groundwater used for drinking water off-site. Mitigative measures taken to preclude further contamination of the

groundwater, coupled with a normally low annual rainfall, may reduce the potential for contaminating city water; however, additional off-site data in the presumed downgradient direction (south) are needed to better characterize the limits of contamination.

Data regarding the fate of the non contact cooling water discharged from the plant are also sparse. Documents indicate that cooling water is mixed and diluted with local surface water before being used to irrigate cropland. Data regarding concentrations of selenium and cadmium, or other metals, in the crops were not available for ATSDR review. Limited air emissions data did not allow a detailed assessment of public health impact; however, as mentioned previously, the measures taken to control emissions and comply with State requirements seem to have been effective and largely limit any obvious impacts to the site itself. Also, the facility is located in a very sparsely populated part of town. Finally, because of the lack of on-site soil characterization data, we have been unable to determine the impact of fugitive dusts arising from on-site land disposal operations.

As mentioned in the Physical and Other Hazards Section of this report, ATSDR believes exposure to radiation may also pose a distinct public health concern or hazard to the residents living in Soda Springs, Idaho.

CONCLUSIONS

This site is of potential public health concern because of the risk to human health resulting from possible exposure to hazardous substances at concentrations that may result in adverse health effects. As described above, exposure to a number of inorganic compounds may have occurred or may still occur through the ingestion and inhalation of or dermal contact with contaminated groundwater or plant air/site fugitive dust emissions.

The lack of actual off-site air characterization data precludes further analysis of the impact on public health through this medium. Similarly, lack of data characterizing irrigation water or concentrations of metals in crops precludes further examination of the food chain. Neither of these potential routes of exposure was noted as a public concern by State health officials contacted during the ATSDR site visit.

RECOMMENDATIONS

1. The existing monitoring well network should continue to be sampled, including the previously contaminated domestic well, to track the contaminated plume migration and concentration. Being directly in the path of plume migration, the domestic well should serve as a particularly good indicator of off-site contamination. Sampling should continue until such time that a clear and statistically supportable conclusion can be drawn to show that the potential for contaminant migration from on-site to off-site areas is no longer significant.

2. Several domestic drinking water wells upgradient and downgradient from the site should be identified for annual sampling to determine if differences in water quality are notable.

3. Irrigation water with and without the cooling water effluent should be analyzed to assess if the concentration of the metals of concern differ significantly. If the difference is significant, crop plant uptake and concentration of these metals should be investigated to determine if the food chain has been affected.

4. Monsanto should continue its efforts in evaluating the potential for impact from air emissions, including fugitive dusts, from its plant activities.

5. It is recommended that the State Department of Health closely monitor plausible health outcomes in residents of Soda Springs related to possible current and past exposure to radioactively contaminated slag.

6. The EPA should continue to review and investigate the radiation contamination levels in the Soda Springs area in order to refine the understanding of the need for possible special remedial efforts. See recommendation number 9 for interim measures suggested by the ATSDR.

7. In accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, the Monsanto Chemical Company site has been evaluated for appropriate follow-up health activities. Although there are indications that human exposure to on-site and off-site contaminants in the groundwater may be currently occurring and may have occurred in the past, this site is not being considered for follow-up health activities at this time. The ATSDR will reevaluate the need for possible additional follow-up health activities when additional information becomes available. Specifically, additional data on plume migration characteristics and trends, impact on other

domestic drinking water wells and irrigation waters, if any, and refined characterization of the impacts of radiation contamination of slag are sought.

8. When indicated by public health needs, and as resources permit, the evaluation of additional relevant health outcome data and community health concerns, if available, is recommended.

9. To alleviate the potential health effects resulting from the exposure to gamma radiation in the Soda Springs, Idaho, area, ATSDR recommends the following:

a. The use of this slag for building material and any other construction purposes should stop immediately.

b. The city or State should repair roads and sidewalks in Soda Springs on an accelerated schedule.

c. Existing material in sidewalks, roadways, and building foundations should be removed during repairs and should not be incorporated into the new structures.

d. A more detailed radiological investigation should be carried out to identify those homes and areas of Soda Springs that have elevated radiation levels. Based on these results, the proper remediation action can be determined.

e. EPA should consider radiation exposures that would result from slag removal activities.

PRELIMINARY HEALTH ASSESSMENT - PUBLIC COMMENT COPY

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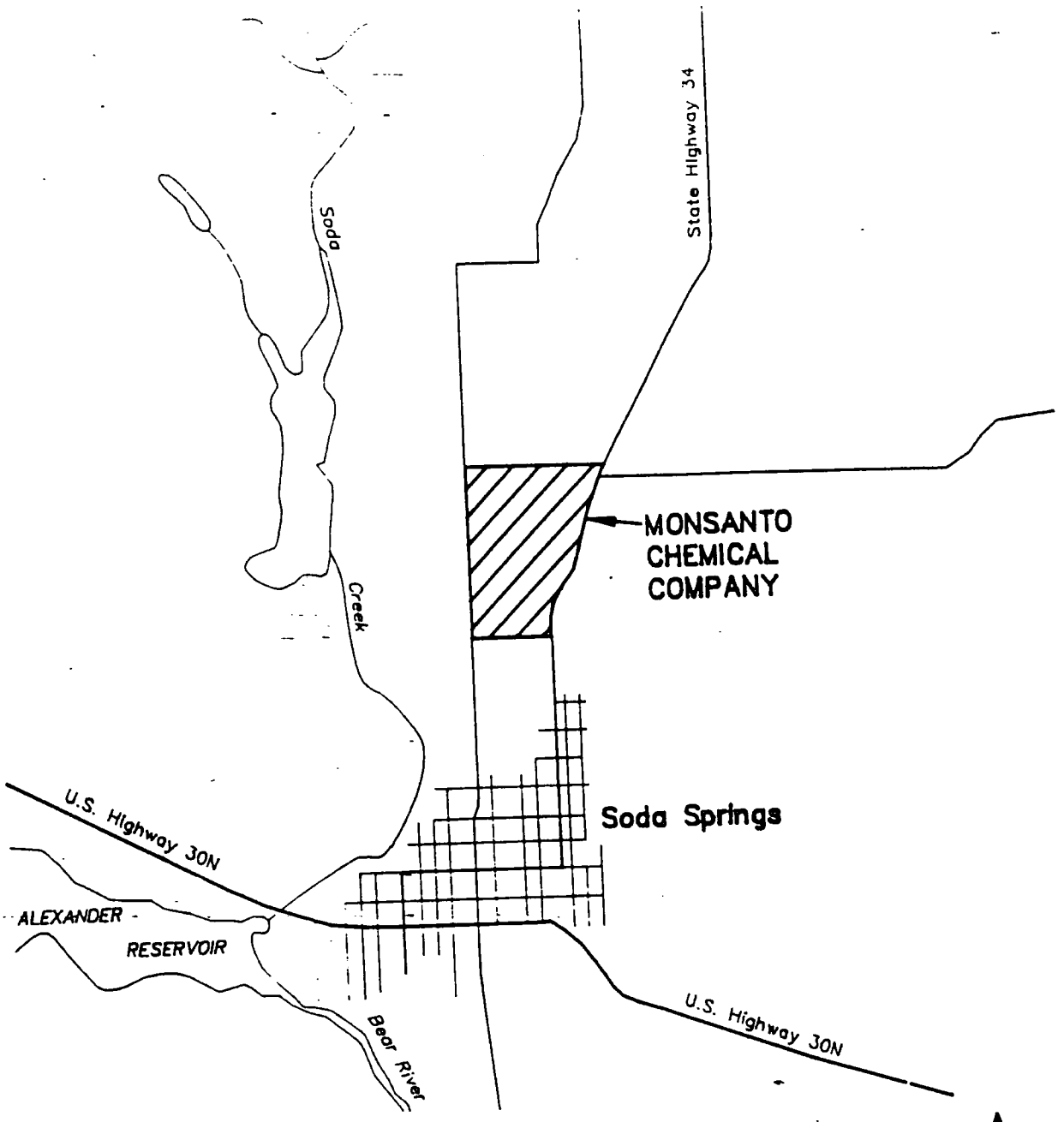
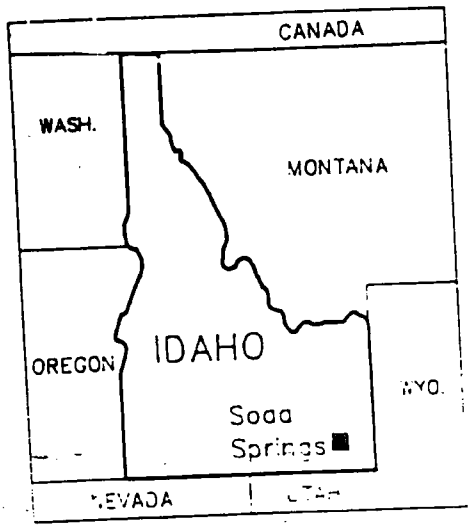
Figure 1





ecology & environment, inc.	
Job: F10-8702-06	Waste Site: ID0024
Drawn by: D. P.	Date: March 25, 1988

LOCATION MAP
MONSANTO CHEMICAL COMPANY
Soda Springs, ID